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P E R C U S S I O N E,
E T
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M O T Ū S
Corporum Percussorum
L I B E L L U S
A U T O R E
Viro Doctissimo, Clarissimoque
J A C O B O
P L A C E N T I N O
In Patavina Universitate
L I B R I T E R T I I A V I C E N N Æ
I N T E R P R E T E .



RECEIVED

LEGISLATIVE

NOTES

OF THE

LEGISLATURE

OF THE

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JACOB

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OF THE

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OF THE



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THE NATIONAL ARCHIVES

RECORDS SECTION

1914-1918

1914-1918



DE PERCUSSIONE ,
ET
Legibus Motus Corporū
percuſſorum
PARS I.

Definitiones .



PROPRIÆ cuſque corporis
materiæ quantitas maſſa
dicitur.

ſpatium, quod occu-
pat, volumen vocatur.

Determinatio ſpatii,
quod occupat, figura

nominatur.

Materia, ex qua corpus conſtat, pe-
culiæres affectiones habet. Vel ejusmo-
di eſt, ut per ſe nullam determinatam
figuram conſervet, & corpus fluidum

con-
ſervat

constituit; vel figuram, quam habet, amittere nunquam potest, & corpus perfecte durum, si quod est, efficit; vel determinatam figuram per se quidem habet, eamque amittere potest, amissam vero per se recuperare non potest, & corpus molle componit; vel demum determinatam figuram habet, eandemque amittere, & amissam per se recuperare potest, & corpus elasticum inter molle, & durum medium constituit.

Vis igitur elastica est affectio corporis, quod inter perfecte durum, & molle medium est, per quam figuram suam amittere, amissam recuperare per se potest. Quæ sit ejus causa. Physicis considerandum relinquimus. Corpora elastica sunt dura omnia, quæ apud nos sunt, ut vitrum, chalybs, ebur lignum.

Nos

Nos hic consideramus leges corporum solidorum, non fluidorum. Et quoniam solida, ut dictum est, vel sunt dura, [etsi corpus perfecte durum nullum fortasse sit] vel mollia, vel inter utraque media; & prima duo non sunt elastica, tertium elasticum est, sive sit perfecte, sive imperfecte elasticum; agemus de Legibus percussionum corporum non elasticorum, & elasticorum: quoniam præterea Leges percussionum corporum non elasticorum simpliciores sunt, quam elasticorum; nos primum de illis agemus.

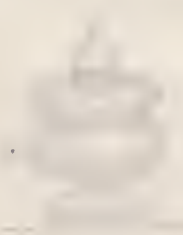
Motus est migratio de loco in locum, vel continua loci, situsque mutatio.

Quietis est in eodem loco, & situ permansio.

Motus, & quietis definitiones, quæ ex
gene:

There is a great deal of
work to be done in the
field of research and
development in the
area of energy and
power. It is necessary
to have a good
understanding of the
principles of energy and
power in order to be able
to design and develop
new and improved
systems.

The first step in the
design process is to
define the problem and
determine the requirements.
This is followed by the
development of a
conceptual design and
the selection of the
appropriate materials and
components.

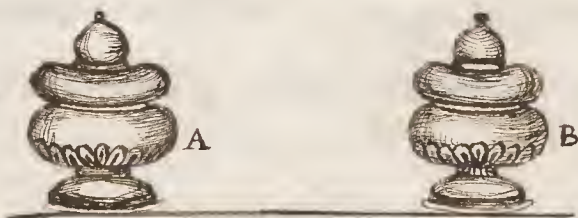


The next step in the
design process is to
develop a detailed design
and to construct a
prototype. This is followed
by the testing and
evaluation of the
prototype and the
final design.

genere, & differentia constant, tradi non possunt: ideo enim motus, & quietis primitivi sunt, ut generaliores, quæ sint earum genera, haberi nequeant.

Motus absolutus corporum est spatii, situsque mutatio. Motus relativus est ipsorum ad se invicem accessio, vel a se invicem recessio.

Quies absoluta est in eodem loco, & situ corporis mansio. Quies respectiva est quum corpora, etsi spatium, situmve mutant, tamen neque ad se invicem accedunt, neque a se invicem recedunt. Sic si corpora A, & B. utcumque mota neque a se invicem accedant, neque a se invicem recedant, respective quiescere dicuntur.



Dir

Directio motus est determinatio, quam habent corpora ad unam, vel altam plagam, in quam feruntur.

Directiones similes motûs sunt determinationes similes, ut omnes dextrorsum, aut omnes sinistrorsum, &c.

Directiones contrarie, vel oppositæ motûs sunt, quæ oppositas determinationes, unam V. G. dextrorsum, alteram sinistrorsum habent.

Velocitas motûs est ratio, quam habet spatium ad tempus, quo idem spatium a corpore, vel ab ejus centro gravitatis percurritur: vel est spatium divisum per tempus, quo idem spatium a corpore, vel ejus centro percurritur.

Velocitas absoluta est, per quam duo, vel plura corpora certo tempore ad se invicem accedunt, vel a se invicem recedunt



These lighthouses were built by the Government of the United States for the purpose of aiding navigation. They are situated at various points along the coast, and are of various sizes and shapes. Some are built on islands, and some on the mainland. They are all built of stone, and are painted in various colors. They are all very beautiful, and are a great help to the sailors.



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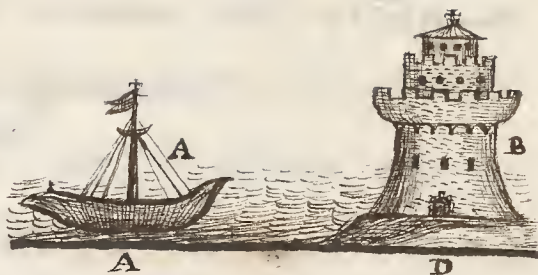
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cedunt.

Hinc sequitur, si
unum corpus A . ad
aliud immobile B .

per rectam AD acce-

dat, velocitatem respectivam equalem esse
velocitati AD corporis A .



Si duo corpora per rectam movean-
tur directione con-

trariâ, A velocita-

te AD . B vero ve-

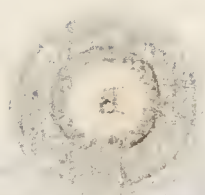
locitate BD . veloci-



tatem respectivam equalem esse summe
velocitatum absolutarum utriusque AD
+ BD .

Si ambo per rectam eâdem dire-
ctione moveantur, velocitatem respec-
tivam equalem esse differentiæ velo-
citatum absolutarum AB . Etenim,

Si



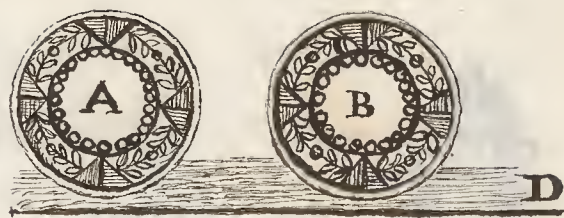
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si quo tempore
B percurrit Lineã
 communem **B D**,
 eodem **A** percur-



rat totam **A D**, manifestum est, **A** per
 solam differentiam **A B** ad corpus **B**
 in **D** accessisse.

Hinc etiam constat, velocitatem re-
 spectivam corporum **A B**, in omnibus
 casibus spatio **A B** ipsis interjecto, an-
 tequam moveri incipiant, innotescere.

Ex definitione velocitatis etiam con-
 stat, corpora, que equali tempore mo-
 ventur, habere velocitates spatiis decur-
 sis proportionales.

Velocitas enim unius sit **V**, veloci-
 tas alterius sit **v**: spatium decursum a
 primo sit **S**, spatium decursum a secun-
 do sit **s**, erit $V. v :: \frac{S}{t} \frac{s}{t}$, Sed $\frac{S}{t} \frac{s}{t} ::$
S s

The first of these is the fact that the
 Government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.

The second is the fact that the
 Government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country. The
 Government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country. The
 Government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.

The third is the fact that the
 Government has been unable to secure
 the necessary funds to carry out its
 policy of non-interference in the
 internal affairs of the country.

Ss ; fractiones enim habentes eundem denominatorem, sunt ut numeratores, ergo ut $Vv :: Ss$. idest velocitas est ad velocitatem, sicut spatium ad spatium.

Constat præterea, corpora, quæ equalia spatia decurrunt, habere velocitates temporibus reciproce proportionales. Sit enim, ut prius $Vv :: \frac{S}{T} \frac{S}{t}$; sed ut $\frac{S}{T}$ ad $\frac{S}{t}$, ita t ad T , fractiones enim eundem numeratorem habentes sunt reciproce, ut denominatores, ergo ut $Vv :: tT$.

Vis corporis, seu quantitas motus est productum ejus massæ in ejus velocitatem.

Massæ per M , vel per m litteras; velocitates per V vel v noventur, vel per characteres arithmeticos, inter quos littera

tera M , vel m interposita est, quorū
 præcedens massam, subsequens veloci-
 tatem significat. Sic $2M3$, vel $2m3$
 significat vim ex 2 masse, & 3
 velocitatis compositam $= 6$

Vires similes, seu conspirantes cor-
 porum sunt quæ habent easdem mo-
 tus directiones.

Vires oppositæ, quæ habent directio-
 nes contrarias.

Vis absoluta corporum est summa
 virium particularium eorundem, sive
 sę conspirantes, sive oppositę sint

Sic si sint $2M5$, & $1m3$, sive M ,
 & m eadem, sive contrariâ directione
 moveantur, vis absoluta eorum erit
 $2.5 + 1.3 = 13$.

Vis relativa corporum est vis, quæ
 nascitur ex comparatione virium par-
 ticu-

ticularium eorundem. Quoniam vero
 vis, quæ nascitur ex comparatione vi-
 rium conspirantium est equalis sum-
 mæ earundem; quæ vero nascitur ex
 comparatione virium oppositarum est
 equalis earum differentię. Perspicuum
 est, vim relativam æqualem esse sum-
 mæ virium particularium, si conspirā-
 tes sint; æqualem vero earum differen-
 tię, si sint oppositę. Sic si $i. m. 3.$ ha-
 bet eandem directionem, ac $2 M 5$; vis
 respectiva erit $2. 5 + i. 3 = 13$. Si
 $i m 3$ habet directionem contrariam ei-
 dem $2 M 5$, vis respectiva erit $2. 5$
 $- i. 3 = 7$.

Ex definitione vis sequitur secundo,
 si nota sit vis, & velocitas, haberi mas-
 sam, ubi vis dividatur per velocitatē.
 Etenim si massa vocetur M , & velo-
 citas

citas V , Liquido constat $\frac{MV}{V} = M$.

$$\frac{MV}{M} = V; \text{ vel } \frac{2 \cdot 3}{2} = 3, \text{ \& } \frac{2 \cdot 3}{3} = 2$$

Sequitur tertio, vim percussioneis esse comparabilem cum simplici gravitate, aut infinitam rationem ad eandem habere: Illa enim exprimitur rectangulo, hæc lineâ rectâ, vel rectangulo infinite parvo. Rectangulum autem cum rectâ incomparabile est, & cum rectangulo infinite parvo infinitam rationem habet.

Sequitur quarto, si duo corpora inæqualia equali velocitate moveantur; eorum vires esse, ut massas. Sit vis unius $2 \cdot 4$, vis alterius $3 \cdot 4$. Si earum ratio fractione exprimat; erit ratio unius ad alteram $\frac{2 \cdot 4}{3 \cdot 4}$, sed $\frac{2 \cdot 4}{3 \cdot 4} = 2 \cdot 3$, ergo &c.

Sequitur quinto, si duo corpora equalia

lia inæquali velocitatē moveantur, eorū
vires esse ut velocitates.

Sequitur sexto, si duo corpora ha-
beant vires æquales, eorum velocita-
tes esse reciproce proportionales massis.
Rectangula enim equalia habent la-
tera reciproce proportionalia.

Percussio directa corporum fit quā
eorum centra in eādem rectā continē-
tur; vel si corpora sint sphaerica, quā
linea eorum centra conjungens transit
per punctum contactus.

Percussio obliqua contra.

Ad leges percussionum per experi-
menta comprobandas in corporibus non
elasticis utimur globulis ex argilla
molli factis a filiis equalibus pendē-
tibus: ad comprobandas leges corpo-
rum elasticorum utimur globulis ebur-
neis

neis, qui ab equalibus etiam filis pendunt, qui quoniam oscillationes equitemporaneas efficiunt; eorum velocitates sunt, ut spatia decursa. Ejusmodi autem experimenta exacte non respondent propositionibus, quas habebimus ob rationes inferius dicendas.

AXIOMATA.

I. Vires non oppositæ se mutuo non destruunt.

II Vires oppositæ, & æquales se mutuo destruunt.

III Virium oppositarum, & inæqualium excessus tantum majoris remanet.

CASUS.

Percussio quatuor modis accidere potest, seu quatuor sunt casus percussionum: vel unum corpus in aliud quie:

quiescens impingit : vel unum im-
pingit in aliud motum in eadem
partes : vel unum impingit in aliud
motum directione contrariâ, & viribus
equalibus. Quatuor igitur propositio-
nibus omnes casus percussionum cor-
porum non elasticorum comprehendun-
tur.

PROPOSITIO I

Si duo corpora non elastica in se
invicem directe, & viribus equalibus
impingant, ambo post ictum consistēt.
Veritas hujus propositionis sequitur ex
axiomate 2. $jM2$ impingat in $2Mj$
directione contrariâ. Quoniam eorum
vires sunt equales : nam $j.2 = 2.j$,
& sunt oppositæ ; se invicem destru-
unt, & jM amittit velocitatem 2, &
 $2M$ velocitatem j .

PRO

PROPOSITIO II.

Si corpus non elasticum in aliud quiescens directe impingat, post ictum ambo conjuncta movebuntur eâdem directione, sed minori velocitate, quam movebatur ante ictum corpus motum. *Propositio patet ex Axiomate I.* Quoniam enim corpus immobile nullâ vi, seu vi infinite parvâ opponitur corpori moto, post ictum tota vis corporis moti manebit: at eâdem vi manente, quantitas materiæ, quæ post ictum moveri debet, est major, quam erat ante ictum; ergo post ictum utrumque corpus minori velocitate movebitur, quam movebatur ante ictum corpus motum. Idem enim accidit post ictum, ac si corpori moto tantum materiæ accessisset, quanta est massa corporis

The first of these is the fact that the
 whole of the world is now in a state of
 confusion. The second is the fact that the
 whole of the world is now in a state of
 confusion. The third is the fact that the
 whole of the world is now in a state of
 confusion. The fourth is the fact that the
 whole of the world is now in a state of
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 confusion. The seventh is the fact that the
 whole of the world is now in a state of
 confusion. The eighth is the fact that the
 whole of the world is now in a state of
 confusion. The ninth is the fact that the
 whole of the world is now in a state of
 confusion. The tenth is the fact that the
 whole of the world is now in a state of
 confusion.

corporis quiescentis, cujus aucta massa, necesse est velocitatem minui, ut eadem vis remaneat.

Velocitas post ictum habebitur, multiplicando prius massam corporis moti per ejus velocitatem. Productum erit vis corporis moti ante ictum: & quoniam post ictum eadem vis manet, hæc eadem vis dividatur per summam utriusque masse & quotiens dabit communem velocitatem post ictum $2Mg \cdot iMo$. quoniam vis M post ictum tota remanet, erit etiam post ictum vis $= i8$, ac divisa per summam massarum, hoc est per $2 + i = 3$, Quotiens erit $i8 : 3 = 6$: & hæc erit velocitas communis post ictum.

PRO

THE UNIVERSITY OF

the University of the State of New York
at the City of New York
in the County of New York
do hereby certify that
the within and foregoing
is a true and correct
copy of the original
as the same appears
from the records
of the said University
and is signed by
the President of the
said University
at the City of New York
this 1st day of June
1888.

PROPOSITIO III

Si duo corpora non elastica viribus inæqualibus, & directionibus contrariis directe in se invicem impingant; post ictum conjuncta juxta directionem præpollentis, sed minori velocitate movebuntur. Propositio patet per Axioma 3: nam post ictum prævit tota vis corporis deoilioris, & cum ea tantundem vis opposita corporis præpollentis. Idcirco excessus tantum præpollentis remanet; idem enim esset post ictum, ac si corpus præpollens hoc solo excessu impingeret in alterum quiescens.

Ut in hoc casu habeatur communis velocitas post ictum, multiplicentur prius masq; singulorum corporum per suas velocitates: producta erunt vires parti:

particulares utriusque : deinde harū
 virium minor subtrahatur a maiore,
 & habebitur earundem differentia : de-
 mum hæc differentia dividatur per
 summam corporum, & habebitur com-
 munis velocitas post ictum. j m s im-
 pingat in 3 M ij directione contrariā,
 vis m erit $j \cdot 5 = 5$. vis M erit $3 \cdot ij$
 $= 33 - 5 = 28$. Hac divisa per sum-
 mam massarum, hoc est per $j + 3 =$
 4 , quotiens erit. $28 : 4 = 7$. Utrum-
 que igitur corpus movebitur post ictū
 velocitate 7.

PROPOSITIO IV

Si duo corpora non elastica eādē
 directione moveantur, & corpus velocius
 in tardius directe impingat, post ictum
 ambo conjuncta movebuntur, minori ta-
 men velocitate, quam summa velo-
 cita:

1. The first part of the paper is devoted to the study of the asymptotic behavior of the solutions of the system (1) as $\epsilon \rightarrow 0$. It is shown that the solutions of the system (1) converge to the solutions of the system (2) in the sense of the weak convergence in the space $L^2(\Omega; \mathbb{R}^n)$.

citatum utriusque ante ictum.

Quum particulares vires non sunt oppositæ, post ictum totæ remanent per axioma I. Minori autem velocitate post ictum utrumque simul movebitur, quam sit summa velocitatum utriusque, idem enim esset, ac si corpus velocius vim utriusque haberet, & in illud immobile impingeret: in quo casu ejus velocitas minor evadit.

Communis velocitas post ictum habetur multiplicando utriusque corporis massam per suam velocitatem: summa productorum dabit summam viriû: dividatur hæc per summam corporum, & quotiens dabit velocitatem communem post ictum.

2. M & impingat in $j m s$ ad easdem partes motum, vis $2 M$ erit

$2.8 = 16$. Vis i m erit $i.5 = 5$:

& quoniam vires non sunt contrarie post ictum remanent ; idcirco earum summa erit $16 + 5 = 21$. Hae divisa per summam massarum , hoc est per $2 + 1 = 3$, quotiens erit $21 : 3 = 7$, & per consequens utrumque corpus post ictum movebitur velocitate 7.

In his quatuor propositionibus abstrahimus a vi, quae in contusione globulorum amittitur. Quum enim globuli ex molli argilla confecti sese percutiunt, figuram mutant, & in placentas convertuntur. Partes igitur argillae unusque globuli ob vim ictus lateraliter moventur, & quanta vis in hoc motu absorbitur, tanto minor est vis post ictum vi ante ictum juxta directionem globulorum. Haec autem
ab

abstractio efficit, ut propositiones experimentis omnino non respondeant.

PROPOSITIO V

Vis percussione est equalis duplo vis amissæ a corpore fortiori, vel est equalis viribus amissis una cum viribus acquisitis, si quæ sunt ab utroque corporum percussorum.

Si corpora moventur directionibus contrariis, & viribus equalibus, ut in I casu, ostensum est, utriusque corporis vires destrui. At percussio est causa, cur eorum vires destruantur; & causa est semper proportionalis effectui, quem gignit: Ergo in hoc casu percussio est equalis summe virium destructarum equalium, seu est equalis duplo alterutrius.

Si corpora moveantur directionibus
con:

contrariis, & vivibus inæqualibus, ostensum est, totam vim debilioris destrui, & cum ea æqualem partem vis corporis fortioris: Præterea constat, corpus fortius communicare partem suæ vis residuæ corpori debiliori, ac propterea æqualem ejusdem partem ipsum amittere: Sed summa harum virium amissarum, & transmissarum est æqualis duplo vis amissæ a corpore fortiori, & est totus effectus percussione: ergo in hoc casu percussio est æqualis duplo vis amissæ a corpore fortiori.

Si unum corpus in aliud quiescens impingat, vidimus post ictum vim omnem manere, & tantam ejus partem corpus motum amittere, quantam communicat quiescenti: At vis ab illo amissa simul cum vi ab hoc acquisita est
du=

The first paragraph of the letter is very short and to the point. It states the purpose of the letter and the reason for writing it. The second paragraph is longer and contains more details. It describes the situation and the actions that have been taken. The third paragraph is also long and contains more information. It discusses the results of the actions and the future plans. The fourth paragraph is the shortest and concludes the letter. It expresses the writer's hope that the recipient will find the information useful and that the letter will be helpful.

dupla vis amissa a corpore fortiori, & est totus effectus percussione: Ergo percussio in hoc casu est equalis duplo vis amissa a corpore fortiori.

Si demum ambo corpora eadem directione moveantur, vidimus, utriusque vim manere, ac propterea idem esse, ac si corpus fortius habens vires utriusque in debilius quiescens incurreret: in quo casu vidimus, percussione[m] equalem esse duplo vis amissa a corpore fortiori.

Si igitur in I casu alterutrum corporum equipollentium pro fortiori sumamus, percussio cum Joanne Wallisio est equalis duplo vis amissa a corpore fortiori.

PRO

10. The first of the three main points of the report is that the

present situation in the world is one of a general decline in the

level of living standards in most of the countries of the world.

The second point is that the present situation is the result of a

series of factors, including the decline in the rate of growth of the

world economy, the increase in the population of the world, and the

increase in the demand for food and other basic necessities.

The third point is that the present situation is a result of a

series of factors, including the decline in the rate of growth of the

world economy, the increase in the population of the world, and the

increase in the demand for food and other basic necessities.

The fourth point is that the present situation is a result of a

series of factors, including the decline in the rate of growth of the

world economy, the increase in the population of the world, and the

increase in the demand for food and other basic necessities.

The fifth point is that the present situation is a result of a

series of factors, including the decline in the rate of growth of the

world economy, the increase in the population of the world, and the

increase in the demand for food and other basic necessities.

PROPOSITIO VI

In omni percussione directa corporum non elasticorum velocitas respectiva perit.

Post percussionem directam corporum non elasticorum vel ambo corpora sistuntur, ut in I casu vidimus, vel ambo conjuncta, hoc est ad easdem partes, & pari velocitate moventur, ut in aliis tribus casibus. Sed velocitas respectiva est, per quam corpora certo tempore ad se invicem accedunt, vel a se invicem recedunt, & ubi ambo sistuntur, aut ambo ad easdem partes, & pari velocitate moventur, neque ad se invicem accedunt, neque a se invicem recedunt: Ergo in omni percussione directa corporum non elasticorum velocitas respectiva perit.

1. *Chrysomelids* 2. *Chrysomelids* 3. *Chrysomelids* 4. *Chrysomelids* 5. *Chrysomelids* 6. *Chrysomelids* 7. *Chrysomelids* 8. *Chrysomelids* 9. *Chrysomelids* 10. *Chrysomelids* 11. *Chrysomelids* 12. *Chrysomelids* 13. *Chrysomelids* 14. *Chrysomelids* 15. *Chrysomelids* 16. *Chrysomelids* 17. *Chrysomelids* 18. *Chrysomelids* 19. *Chrysomelids* 20. *Chrysomelids* 21. *Chrysomelids* 22. *Chrysomelids* 23. *Chrysomelids* 24. *Chrysomelids* 25. *Chrysomelids* 26. *Chrysomelids* 27. *Chrysomelids* 28. *Chrysomelids* 29. *Chrysomelids* 30. *Chrysomelids* 31. *Chrysomelids* 32. *Chrysomelids* 33. *Chrysomelids* 34. *Chrysomelids* 35. *Chrysomelids* 36. *Chrysomelids* 37. *Chrysomelids* 38. *Chrysomelids* 39. *Chrysomelids* 40. *Chrysomelids* 41. *Chrysomelids* 42. *Chrysomelids* 43. *Chrysomelids* 44. *Chrysomelids* 45. *Chrysomelids* 46. *Chrysomelids* 47. *Chrysomelids* 48. *Chrysomelids* 49. *Chrysomelids* 50. *Chrysomelids* 51. *Chrysomelids* 52. *Chrysomelids* 53. *Chrysomelids* 54. *Chrysomelids* 55. *Chrysomelids* 56. *Chrysomelids* 57. *Chrysomelids* 58. *Chrysomelids* 59. *Chrysomelids* 60. *Chrysomelids* 61. *Chrysomelids* 62. *Chrysomelids* 63. *Chrysomelids* 64. *Chrysomelids* 65. *Chrysomelids* 66. *Chrysomelids* 67. *Chrysomelids* 68. *Chrysomelids* 69. *Chrysomelids* 70. *Chrysomelids* 71. *Chrysomelids* 72. *Chrysomelids* 73. *Chrysomelids* 74. *Chrysomelids* 75. *Chrysomelids* 76. *Chrysomelids* 77. *Chrysomelids* 78. *Chrysomelids* 79. *Chrysomelids* 80. *Chrysomelids* 81. *Chrysomelids* 82. *Chrysomelids* 83. *Chrysomelids* 84. *Chrysomelids* 85. *Chrysomelids* 86. *Chrysomelids* 87. *Chrysomelids* 88. *Chrysomelids* 89. *Chrysomelids* 90. *Chrysomelids* 91. *Chrysomelids* 92. *Chrysomelids* 93. *Chrysomelids* 94. *Chrysomelids* 95. *Chrysomelids* 96. *Chrysomelids* 97. *Chrysomelids* 98. *Chrysomelids* 99. *Chrysomelids* 100. *Chrysomelids*

1924

DE PERCUSSIONE,
ET
Legibus motus corporum
percussorum perfecte
elasticorum.

PARS II.

MULTÆ, ac varię regulę a mechanicis traditę sunt ad estimandos motus corporum percussorum perfecte elasticorũ: unam hic trademus, & demonstrabimus, quę cęteris facilior est, & per quam intelligemus rationem effectuum omnium, qui in eorundem corporum percussione contingunt.

Motus, qui a percussione nascuntur corporum non elasticorum simplices vocentur, ut ab iis distinguamus, qui nascuntur a percussione corporũ elasticorũ

PRO

THE HISTORY OF

the first part of the reign of
James the First of Scotland
from the year 1406 to 1437
by James Hume Esq.
of the Middle Temple
London Printed by J. Baskin
at the Sign of the Sun in St. Dunstons Church
Lane 1727

Printed by J. Baskin
at the Sign of the Sun in St. Dunstons Church
Lane 1727

PROPOSITIO I.

Elasticitas perfecta est equalis vi percussionis.

Elasticitas perfecta, quaecumque ejus causa fuerit, est vis, per quam corpora figure mutationem passa, figuram eandem recuperant. At figure mutatio in corporibus percussis est totus effectus percussionis: & totus effectus percussionis destrui non potest, nisi a causa equipollente; ergo elasticitas perfecta est equalis vi percussionis.

Corollarium

Quoniam vero percussio est equalis duplo vis amisse a corpore fortiori per 5^{am} propositionem partis I. sequitur, elasticitatem perfectam esse equalem duplo vis amisse a corpore fortiori.

PRO

THE GAZETTE

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THE GAZETTE

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PROPOSITIO II

Elasticitas est contraria vi percussio-
nis. Percussio corpora elastica utrinque
flectit, & eorum partes intro pellit. ela-
sticitas contra corpora utrinque erigit,
& eorum partes protrudit: Ergo &c.

PROPOSITIO III

Elasticitas perfecta dimidiam partem
sue vis communicat uni, dimidiam alte-
ri corporum directe percussorum. Elasticitas
perfecta equali vi utrinque se explicare
nititur, ergo dimidiam partem sue vis
communicat uni, dimidiam alteri corpo-
rum percussorum.

Corollarium

Quoniam vero per corollarium secundæ
hujus vis elasticitatis est equalis duplo
vis amissæ a corpore fortiori; consequens
est, ut dimidiam partem vis amissæ a
corpo:

corpore fortiori communicet uni, dimidiam
alteri eorundem.

PROPOSITIO IV.

Vis, quam elasticitas communicat cor=
pori percusso, quod ante ictum erat for=
tius, habet directionem contrariam ejus
motui simplici. Vis, quam communicat
corpori, quod ante ictum erat debilius,
habet directionem eandem ipsius motus
simplicis. Vis, quam communicat utrique,
ubi vivibus equalibus, & directione con=
traria in se invicem impingentia o=
mnem motum amittunt, habet directio=
nem contrariam motui utriusque ante
ictum. Veritas hujus propositionis ex
propositionibus I. II. III. IV. primæ
partis facile perspicitur.

Ex his omnibus habetur regula ge=
neralis ad supputandos motus post
ictum

ictum corporum perfecte elasticorum in se invicem directe impingentium, quæ huiusmodi est.

Primo inveniatur duplum vis amissæ a corpore fortiori post ictum, tamquam si non esset elasticum.

Secundo dimidium summae dividatur per massam unius, item per massam alterius, & quotientes dabunt eorum velocitatem post ictum ab elatere productam.

Tertio hanc adde velocitati simplici corporis, quod ante ictum erat debilius; subtrahere velocitati simplici corporis, quod ante ictum erat fortius, subtrahere ab utroque, ubi ambo viribus equalibus, & directione contrariâ in se invicem impingentia post ictum consistèrent, si non essent elastica; hoc
est

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 "The second is the fact that the
 the third is the fact that the

the fourth is the fact that the
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the nineteenth is the fact that the

the twentieth is the fact that the

est, nota signis contrariis motui, quem ante ictum habebant; & summa, vel differentia dabit eorum velocitatem post ictum.

Demonstratio hujus regulę constat ex propositionibus I. II. III. & IV hujus, ut exemplis patebit.

PROPOSITIO V

Seu primus casus in elasticis.

Si duo corpora elastica vivibus equalibus, & directione contraria in se invicem directe impingant, ambo post ictum eadem velocitate, & directionibus contrariis movebuntur. $jM2$ impingat in $2m j$ directione contrariā, duo jM post ictum reverti velocitate 2, & $2m$ velocitate j . jM vis amissa ob percussionem est $j.2 = 2$, $2m$ vis amissa ob ictum est $2.j = 2$ summa
viri

vivium amissarum = 4 cui vis elasticitatis est equalis.

Elasticitas ejus dimidium communicat corpori jM , quod divisum per ejus massam dat velocitatem $2 : j = 2$.

Ejus itidem dimidium communicat corpori $2m$, quod divisum per ejus massam dat velocitatem $2 : 2 = j$. At si hæc corpora non essent elastica, consisterent, quia vivibus equalibus, & directione contraria in se invicem impigerunt; in quo casu elasticitas imprimit corporibus vim contrariam motibus utriusque ante ictum. Ergo post ictum movebuntur eadem velocitate, & directionibus contrariis.

PRO

PROPOSITIO VI

seu casus secundus in elasticis

Si corpus elasticum in aliud quiescens directe impingat, post ictum is motus sequetur, quem calculus indicabit. $2M$ g impingat in imo . Si non essent elastica, post ictum moverentur simul motu simplici, velocitate $\frac{2 \cdot g}{2+1} = \frac{18}{3} = 6$.

$2M$ vis ante ictum erat $2 \cdot g = 18$.

$2M$ vis post ictum est $2 \cdot 6 = 12$.

Ergo $2M$ vis amissa est $= 6$, cui dupla est vis elasticitatis $= 12$.

Elasticitas dimidiam partem suae vis communicat corpori $2M = 6$.

Hæc divisa per massam dat velocitatem $6 : 2 = 3$; sed hæc velocitas ab elatere producta... habet directionem contrariam motus simplicis, quia

the first of these was the fact that the
 government had been unable to secure
 the necessary funds to carry out its
 policy of non-interference.

The second of these was the fact that the
 government had been unable to secure
 the necessary funds to carry out its
 policy of non-interference. The third of these
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 of these was the fact that the government
 had been unable to secure the necessary funds
 to carry out its policy of non-interference.

quid $2M$ est corpus validius, & $2M$ post ictum movebatur motu simplici, velocitate 6, ergo post ictum movebitur velocitate $6 - 3 = 3$.

Elasticitas imprimat corpori i in vim 6; hæc divisa per ejus massam dat velocitatem $6 : i = 6$; sed hæc velocitas ab elatere producta habet eandem directionem, quam velocitas motus simplicis, quia m est corpus debilius, & movebatur post ictum motu simplici, velocitate 6, ergo post ictum movebitur velocitate $6 + 6 = 12$.

Si corpora sint equalia, & elastica post ictum corpus motum quiescit, & quiescens movebitur eadem directione, & velocitate, qua ante ictum movebatur corpus motum. iM 12 directe impingat in $iM0$, per regulam in
ve-

1. The first part of the paper is devoted to a general discussion of the problem.

2. The second part is devoted to a detailed analysis of the case of a single particle.

3. The third part is devoted to a detailed analysis of the case of a system of particles.

4. The fourth part is devoted to a detailed analysis of the case of a system of particles.

5. The fifth part is devoted to a detailed analysis of the case of a system of particles.

6. The sixth part is devoted to a detailed analysis of the case of a system of particles.

7. The seventh part is devoted to a detailed analysis of the case of a system of particles.

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11. The eleventh part is devoted to a detailed analysis of the case of a system of particles.

12. The twelfth part is devoted to a detailed analysis of the case of a system of particles.

13. The thirteenth part is devoted to a detailed analysis of the case of a system of particles.

14. The fourteenth part is devoted to a detailed analysis of the case of a system of particles.

15. The fifteenth part is devoted to a detailed analysis of the case of a system of particles.

16. The sixteenth part is devoted to a detailed analysis of the case of a system of particles.

17. The seventeenth part is devoted to a detailed analysis of the case of a system of particles.

18. The eighteenth part is devoted to a detailed analysis of the case of a system of particles.

19. The nineteenth part is devoted to a detailed analysis of the case of a system of particles.

20. The twentieth part is devoted to a detailed analysis of the case of a system of particles.

venietur, *IM* 12 post ictum quiescere,
& *im* 0 moveri velocitate 12

Corollarium

Ex hoc inferitur, si sint plura corpora
equalia perfecte elastica, puta quinque
quiescentia, in quæ unum singulis æ-
quale impingat, quatuor proxima post
ictum manere, ultimum moveri veloci-
tate impingentis. Et ratio est, quia pri-
mum post ictum omnem motum amit-
tit, quia pari vi in oppositas partes
pellitur; videlicet a dimidia vi im-
pulsus, quæ illi remanet, & a vi ela-
sticitatis contraria, quæ eidem equalis
est. Sic de secundo, & c. Dicendum.
Ultimum vero pellitur a vi impulsus,
& a vi elasticitatis simul, quæ equa-
les sunt inter se, & æquales vi primi:
ergo & c.

Si

Si sint duo iisdem equalia, & pari
velocitate mota, quæ in illa quinque
impingant; tria proxima post ictum im-
mota manere, postrema duo eadem velo-
citate conjuncta moveri, ac movebantur
ante ictum duo, quæ in illa impege-
runt.

Si sint tria iisdem equalia, quæ
in illa quinque impingant; duo ex
illis post ictum quiescere manere, postrema
tria pari velocitate moveri.

Si sint quatuor in illa quinque pa-
ri velocitate impingentia; quatuor po-
strema post ictum moveri; primum,
in quod quatuor illa impegerunt, qui-
etiam manere. In summa quot sunt,
quæ moventur ante ictum, tot esse, quæ
moventur post ictum.

Si corpus quiescens sit triplum mo-
to

to, hujus velocitas post ictum inter utrumque equaliter distribuetur. $IM4$ impingat in $3m0$, per regulam invenietur, post ictum utrumque moveri velocitate 2, nimirum velocitate corporis moti ante ictum equaliter inter utrumque divisâ, sed directione contrariâ, videlicet M velocitate -2 , & m velocitate 2.

PROPOSITIO VII

Corpus elasticum majorem velocitatem communicat alteri quiescenti, sive majori, sive minori, quem ipsum movet per aliud corpus mediæ inter utrumque magnitudinis, quam quem ipsum immediate movet.

$IM18$ incidat primum in $2m$, & $2m$ in $4n$; deinde idem $M18$ immediate incidat in idem $4n$. Dico primo, $IM18$ majorem velocitatem com-
mu-

municare corpori $\& n$, quum median-
te corpore $2 m$ ipsum movet, quam
quum ipsum movet immediate.

Si $i M i 8$ incidat in $2 m 0$; repe-
rietur per regulam, $2 m 0$ post ictum
moveri velocitate $i 2$.

Si rursus $2 m i 2$ incidat in $\& n 0$,
reperietur, $\& n 0$ post ictum moveri ve-
locitate 8 : ergo $i M i 8$ movens $\& n 0$,
mediante corpore $2 m$ ipsum movet
velocitate 8 .

Idem $i M i 8$ immediate impingat
in $\& n 0$, reperies, vim ab ejus ela-
sticitate eidem impressam esse equalem
 $\frac{72}{5}$: si hanc divides per ejus massā
 4 , reperies ejus velocitatem esse $\frac{72}{20} = \frac{18}{5}$,
& quoniam $\& n$ movebatur post ictum
motu simplici, velocitate $\frac{18}{5}$ post ictum
movebitur, quia elasticum est, veloci-
tate

$$\text{tate } \frac{18}{5} + \frac{18}{5} = \frac{36}{5} = 7 \frac{1}{5}.$$

i M **i s** movens **4 n** mediante corpore **2 m**, ipsum movet velocitate **8**: Ergo majorem velocitatem eidem communicat, quam mediante corpore **2 m** ipsum movet, quam quum movet immediate.

Si rursus **4 n i s** impingat in **2 m**, & **2 m** in **i M**, & postea **4 n i s** immediate impingat in **i M**; dico, **4 n i s** majorem velocitatem communicare corpori **i M**, quam mediante corpore **2 m** ipsum movet, quam quum idem movet immediate.

Si **4 n i s** incidat in **2 m o**, invenietur, **2 m o** post ictum moveri velocitate **24**.

Si rursus **2 m 24** incidat in **i m o**; invenietur, **2 m o** post ictum moveri velocitate **32**.

Idem

Idem corpus 4 n i s immediate im-
pingat in i M o, reperietur, i M o post
ictum moveri velocitate $\frac{72}{5} + \frac{72}{5} = \frac{144}{5} =$
 $\frac{288}{5}$: sed 4 n i s movens i M o, me-
diante corpore 2 m, idem movebat velo-
citate 32 ; movens immediate eidem
communicat velocitatem $\frac{288}{5}$: Ergo ma-
jorem velocitatem eidem communicat,
quam ipsum movet per aliud cor-
pus medie inter utrumque magnitu-
dinis, quam quam ipsum movet
immediate.

Tam admirandi Phenomeni a præsti-
tissimo Ughenio inventi causa est
vis elastica, quæ velocitatem commu-
nicat utrique corpori percusso, sed cō-
tra directionem motus simplicis cor-
poris fortioris, & juxta directionem
motus simplicis corporis debilioris.

Quoni

Quoniam vero corpus debilius est id,
quod ante ictum quiescebat, ea re fit,
ut vis elastica ejus motum simplicem
post ictum augeat.

Quoniam vero ubi unum corpus
aliud quiescens immediate movet, hoc
augmentum motus ab elatere produ-
ctum semel tantum corpori quiescenti
fit: & ubi per medium aliud cor-
pus idem movet; hoc motus aug-
mentum, quantulacumque sit, bis fa-
ctum est; sequitur, ut corpus elasti-
cum majorem velocitatem communi-
cet alteri quiescenti, quam ipsum
movet per aliud corpus mediū in-
ter utrumque magnitudinis, quam
quum ipsum immediate movet.

Hinc sequitur, si 100 corpora
in proportionē geometricā disposi-
ta

ta sint, & quorum ratio sit dupla, & motus a majore incipiat, velocitatem minimi post ictum esse ad velocitatem maximi ante ictum, ut 147600000000 : si motus incipiat a minimo, velocitatem maximi post ictum esse ad velocitatem minimi ante ictum, ut num. 16770000000000 ad 1 . Ita D. Carè in memoriis Accademig scientiarum anni 1706.

PROPOSITIO VIII.

Corpus quantumvis finite parvum velocitate quantumvis parvâ motum, corpori quantumvis finite magno quiescenti motum aliquem communicat: Id per allatam regulam manifestum fiet, & ratione demonstrabitur. Quum enim corpus quantumvis finite parvum velocitate quantumvis finite parvâ

vā motum vim aliquam habeat, & corpus quantumvis finite magnum, & quiescens vim nullam habeat, aut infinite parvam; sequitur, hoc vi nulla, aut infinite parva opponi vi illius, ac propterea totam illius vim manere: Sed quem illud in hoc impingit vim aliquam amittit, ergo quantumvis illud amittit, tantum hoc acquirit: sed vis ab hoc acquisita est productum ejus masse in velocitatem: ergo velocitatem aliquam ab illius percussione acquirit.

PROPOSITIO IX

Seu tertius casus in elasticis

Si duo corpora elastica in se invicem directe impingant viribus inaequalibus, & directione contraria, post ictum is motus sequetur, quem calculus

culus indicabit.

IMS impingat in $3m$ ii directione contrariâ: si non essent elastica, post ictum moverentur simul motu simplici, & juxta fortioris $3m$ velocitate $\frac{3 \cdot ii - i5}{1 + 3} = \frac{28}{4} = 7$.

Vis ante ictum $m3 \cdot ii = 33$

Vis post ictum $m3 \cdot 7 = 21$, cui dupla est vis elasticitatis.

Elasticitas dimidium suæ vis communicat corpori $M = i2$. hæc divisa per ejus massam dat velocitatem $i2:i$, sed hæc velocitas ab elatere producta habet eandem directionem, ac ejus motus simplex; quia M est debilius, & motu simplici movebatur velocitate 7 : ergo post ictum movebitur velocitate $7 + i2 = i9$ juxta ejus directionem.

Ela

Elasticitas imprimit corpori m vim
 $= 12$. Hęc divisa per ejus massam
 dat velocitatem $12:3 = 4$; sed hęc
 velocitas ab elatere producta habet dire-
 ctionem contrariam directioni motus sim-
 plicis, quia m est validius, & m post
 ictum movebatur motu simplici, velo-
 citate 7; Ergo post ictum movebitur ve-
 locitate $7 - 4 = 3$ contra ejus directio-
 nem.

Si corpora sint equalia, post ictum
 movebuntur directione contrariâ, & ver-
 mutata velocitate.

$2M4$ impingat in $2m6$ directio-
 ne contrariâ, invenietur, $2M$ post ictum
 moveri velocitate 6, & $2m$ velocitate
 4.

Si unum sit duplum alterius, &
 moveatur velocitate duplâ, illud post
 ictū

The present is the first of a series of
 papers on the subject of the
 CMS. The first paper is on the
 subject of the CMS. The second
 paper is on the subject of the
 CMS. The third paper is on the
 subject of the CMS.

PROPOSITION 2.

Let f be a function of class C^k on \mathbb{R}^n .

Then

the function f is in the class C^k on \mathbb{R}^n .
 The proof of this proposition is
 given in the next section. The
 proof is based on the fact that
 the function f is in the class
 C^k on \mathbb{R}^n .

The next proposition is a
 corollary of the previous one.
 It states that if f is a
 function of class C^k on \mathbb{R}^n ,
 then the function f is in the
 class C^k on \mathbb{R}^n .

The next proposition is a
 corollary of the previous one.

Q.E.D.

ictum consistet, & hoc movebitur utriusque velocitate, & directione contrariâ.

2M2 impingat in jm directione contraria; reperietur 2M post ictum sisti jm moveri velocitate 3, & directione contraria.

PROPOSITIO X.

Seu quartus casus in elasticis ~

Si duo corpora elastica eâdem directione moveantur, & corpus velocius in tardius directe impingat; post ictum is motus sequetur, quem calculus indicabit.

2M8 impingat in jm ad eadem partes motum, post ictum moveantur simul motu simplici, velocitate

$$\frac{2 \cdot 8 + j \cdot 5}{2 + j} = 2j : 3 = 7$$

2M vis ante ictum est $2 \cdot 8 = 16$.

2M

$2M$ vis post ictum est $2 \cdot 7 = 14$.

$2M$ vis amissa est $= 2$, cui dupla est vis elasticitatis.

Elasticitas ergo communicat corpori $2M$ vim 2 , quæ divisa per ejus massam dat $2 : 2 = 1$. Sed $2M$ movebatur post ictum motu simplici, velocitate 7 , & erat corpus validius; ergo post ictum movebitur velocitate $7 + 1 = 8$.

Elasticitas communicat corpori m vim 2 , quæ divisa per ejus massam dat velocitatem $2 : m = 2/m$; sed m est corpus debilius, & post ictum movebatur motu simplici, velocitate 7 ; ergo post ictum movebitur velocitate $7 + 2/m = 9$.

Si corpora sint equalia; post ictum movebuntur permutatis velocitatibus.

The first of these is the fact that the
 number of cases of the disease is
 increasing. This is due to the fact that
 the disease is becoming more common
 in the population. The second fact is
 that the disease is becoming more
 severe. This is due to the fact that
 the disease is becoming more common
 in the population. The third fact is
 that the disease is becoming more
 difficult to treat. This is due to the fact
 that the disease is becoming more common
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 in the population.

THE DISEASE

The first of these is the fact that the
 number of cases of the disease is
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 in the population. The third fact is
 that the disease is becoming more
 difficult to treat. This is due to the fact
 that the disease is becoming more common
 in the population.

IM_8 impingat in im_4 ad easdem partes, invenietur IM post ictum moveri velocitate 4, & im velocitate 8, hoc est permutatis velocitatibus

Si impingens sit subtripulum alterius, & alterius velocitas sit subtripla impingentis, impingens post ictum consistet.

IM_3 incidat in $3m_1$, invenietur, IM post ictum sisti, & $3m$ moveri velocitate 2

PROPOSITIO XVI

Corpora perfecte elastica in se invicem directe impingentia, eadem velocitate respectiva tum ante, tum post ictum moventur.

In omni percussione directâ corporum non elasticorum velocitas respectiva p̄vit propositione II primâ par

partis. Elasticitas perfecta eandem velocitatem respectivam iisdem corporibus restituit, ergo corpora perfecte elastica in se invicem directe impingentia tum ante tum post ictum eadem velocitate respectivâ moventur.

PROPOSITIO XII.

Eadem vis relativa corporum perfecte elasticorum in se invicem directe impingentium tum ante, tum post ictum remanet.

Vis relativa corporum est vis, quæ resultat ex comparatione virium particularium eorundem, quatenus conspirantes, vel oppositæ sunt: hoc est vis relativa corporum est equalis summe virium particularium, si conspirantes sint; est equalis earum differentie, si sint oppositæ. Sed in perfecte elasticis summa virium conspirantium

Spi:

spirantium ante ictum est equalis summe earundem post ictum. Ergo vis relativa corporum perfecte elasticorum in se invicem perfecte impingentium tum ante tum post ictum remanet.

Tum in elasticis, tum in corporibus non elasticis abstrahimus a vi, quæ in collisione corporum amittitur; ob quam absorptionem fit, ut propositiones experimentis exacte non respondeant.

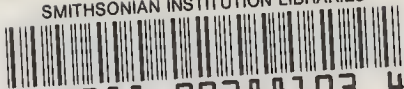
Corpora enim non elastica dum in se invicem impingunt, figuram mutant, ac propterea ejus partes ob vim ictus lateraliter moventur, signo manifestissimo in hoc motu laterali vim aliquam amitti. In collisione autem corporum elasticorum vim aliquam amitti vel ex eo constat, quod ejusmodi corpora in se invicem impin:
gentia

the first of these is the fact that the
the second is the fact that the
the third is the fact that the
the fourth is the fact that the
the fifth is the fact that the
the sixth is the fact that the
the seventh is the fact that the
the eighth is the fact that the
the ninth is the fact that the
the tenth is the fact that the

gentia sonum edunt; sonus autem
nascitur ex tremore partium aeri com:
municato; & quantum tremoris illa
communicant aeri, tantum virium am:
mittunt. Accedit, quod corpora perfe:
cte elastica vix, ac ne vix quidem
habentur. Ex quibus consequitur, ut
Leges motus corporum percussorum
tum elasticorum tum non elastico:
rum exquirere haberi nequeant.

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De percussione et legibus motus corporum

